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Report of the Transition Group on Integrating Surveys for the Ecosystem Approach (TGISUR)

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ICES International Council for the Exploration of the Sea

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Contents

Executive Summary

The Transition Group on Integrating Surveys for the Ecosystem Approach (TGISUR) laid out a series of steps that would be followed to achieve the aim of better integration between the surveys carried out and the needs of the Ecosystem Approach to Fisheries Management (EAFM).

1) Catalogue the data that are most needed for the ecosystem approach i.e. the data needs to support ecosystem modelling within the EAFM. To achieve this step the TGISUR proposed a workshop on this subject to be held in 2010 and to include ecosystem modellers and survey practitioners.

2) The currently available suite of survey métiers and survey activities will then be related to this catalogue to determine how much of this we now do collect or can collect, and also what additional data collection procedures are required.

3) Design a modified survey programme that best addresses the needs identified in step 1 and the potentials and gaps identified in step 2. This part of the approach should encompass data collection that does NOT involve survey vessels.

4) Identify potential redundancies in the survey programme that could be used to enhance the EAFM data collection. The aim here is not to break time-series or to discontinue surveys. The aim is to find the best benefit we can obtain from our surveys both in terms of the existing time-series and our expanding data needs for the EAFM.

Each step would be realized through specific workshops; the first programmed for spring 2010 and entitled the Workshop on Cataloguing Data requirements from surveys for the EAFM (WKCATDAT), to be held in Galway, Ireland 20–22 April, 2010.

1 Terms of Reference

The Transition-Group on Integrating Surveys for the Ecosystem Approach [TGISUR] (Chair: D. Reid*, Ireland) will be established and meet during the ASC in 2009 to:

a) Develop surveys to be applicable to the ecosystem approach;

b) Identify expert groups and develop terms of reference for them;

c) Identify issues common to all surveys, set up workshops and manage them as appropriate;

d) Identify complementary technology to add value to surveys.

TGISUR will report by 1 November 2009 for the attention of SCICOM.

2 Survey Development (addressing ToR a)

A series of steps were laid out by the EG that could be used to develop ICES surveys to facilitate the Ecosystem Approach.

2.1 Catalogue of data requirements

The most basic initial need would be a catalogue of what data are most needed for the ecosystem approach. In general, this probably means the data needs to support the types of ecosystem modelling generally envisaged as a key part of the EAFM. This would come before any consideration of how existing or new surveys could provide this. This could include *inter alia* data on:

- Commercial fish and invertebrates
- Other biota – vertebrate, invertebrate, flora, prokaryotes??
- Stomach contents
- Habitat information – substrate, community etc.
- Oceanography – salinity, temperature, pH, nutrients, water movements, weather etc.

For each type of data we should also aim to describe the level of detail and quality at which that data would be needed. This would include spatial resolution (e.g. how many samples and how close together) and temporal resolution (how often – once a year, once a month??). It might also include considerations of subsampling, and the level of detail needed e.g. animal lengths, weights, ages etc.

The aim here would be to construct a "wish list" of everything that could conceivably be required for the EAFM, and at the best appropriate quality. This should encompass anticipated needs as well as those currently identifies. However, it was recognized that this would probably only be achievable in an ideal world. Therefore, in addition, we should also define the minimum data needs that would be acceptable or useable for any modelling or empirical analyses. This could be defined as "ideal" and "minimum" data quality. A final consideration should be to prioritize these data needs, which are essential, and which are less so, and again, what is the minimum required.

2.2 Relating data needs to survey métiers

The second step will be to relate the data needs catalogue from the first step with the currently available suite of survey métiers and survey activities.

Initially this will involve documenting what ecosystem data needs are currently provided from existing surveys. This could be either as a routine activity (e.g. fish sampling) or on the basis of specific requests (e.g. cetacean observation). In each data case, we should document how well these data provision matches up to the "ideal" and "minimum" data levels.

Secondly we should document where existing surveys and métiers *could* provide such data, but currently do not. The reasons why a survey would not provide such data may simply be that it has not been tasked to do so, but could technically do so e.g. for lack of people or equipment. Alternatively, the survey may be able to encompass these data collection requirements, but this would need a modification in that survey. For example, where the area covered is not sufficient, the timing (season) is wrong, or the additional work would need a longer time in the field.

Within this process it would be important to remain aware of the value of the long time-series of particular datasets that have been produced by the surveys. While the continuation of such time-series should be considered important, it is also important to take a critical view of those time-series; are they actually used in any real way; could we retain their value with a reduced or modified collection programme (see below).?

The basic aim here would be to determine how much of the data needs we are currently filling, how much we could fill without change to the surveys, and how much we could fill if we modified our surveys. This process should also reveal those data needs for which we would need completely new approaches.

A promising initial approach to this work would be to examine existing multidisciplinary surveys targeted on an ecosystem approach. One example would be the comprehensive International ecosystem survey in the Nordic Seas (ICES, 2009), which focuses on the pelagic ecosystem. Another example focusing on groundfish survey methodology would be the multidisciplinary survey carried out by CEFAS collecting demersal fish and epibenthic invertebrates, CTD, water samples, SPI camera, video footage, sediment characteristics, and infauna and meiofauna. This offers a unique opportunity to examine the benefits and feasibilities of collecting data on multidisciplinary surveys. TGISUR would encourage the analysis of these data with regards to the spatial scales of variability, stratification with respect to monitoring requirements, and examine what can be learned about the interactions between the different ecosystem components and how this might feed into future requirements such as the MSD.

2.3 Redesign the surveys

It is likely that we are currently not even providing all the "minimum" level of data requirements. It is also likely that small modifications to the surveys will not provide sufficient improvement. In that case, the next step should be to set out to describe, *de novo*, ecosystem surveys that are designed for purpose. This approach should draw on the existing survey métiers but should not be restricted by them. Again, this could be considered as an "ideal world" approach, but currently, most (but not all) ecosystem surveys have evolved from older, primarily fishery, surveys.

Data collection need not be restricted to research vessels. Where possible, we should identify where data can usefully be collected using remote techniques (e.g. satellite), fixed sampling tools (e.g. buoys), ships of opportunity (e.g. CPR), or autonomous vehicles (alone or with research vessels). Given that, the aim is to support the Ecosystem Approach to *Fisheries* Management, consideration should be given to the poten-

tial use of fishing vessels in this context. A good example to date would be the very high resolution bathymetry data produced by OLEX, derived from fishing vessel echosounders. This data source has already been used for geological research, and, it could be argued, that fishing vessels visit most areas where the EAFM would be an issue!!

2.4 Identify potential redundancy in current surveys

Many of our current survey programmes have been set up based on a very restricted set of data requirements, usually fishery based. As mentioned above, they have also often "evolved" in design, rather than be designed for purpose. It is possible that some of these surveys actually collect more data than is needed for the current purposes. An obvious example would be that most surveys are carried out annually as a default, but is this necessary? Some surveys are carried out biennially or even triennially e.g. the triennial mackerel and horse mackerel egg survey, and yet are sufficient for the assessment and advice needs. Equally, we may not need to carry out as many trawl stations within the IBTS as we currently do. It is also, of course, possible that we need to have *more* intensive sampling, and this should also be determined. Other redundancies that have been previously identified include the use of downtime during existing surveys. For instance, again on the IBTS, there is no sampling during the hours of darkness, and this time has occasionally been used for additional sampling e.g. of the benthos. Between stations steaming could also be used for additional sampling e.g. using echosounders.

One of the problems arising from the evolutionary nature of surveys is that we have little clear idea of what sampling effort would be optimal. New surveys are often started at very low intensity levels, as "pilots". If we do need new surveys within the EAFM, it must be emphasized that these be initiated in the most appropriate manner. One possible approach to arriving at the "best" level of sampling is to start the surveys at a high sampling intensity for at least one cycle. This then provides a rich dataset upon which we can examine variance and power issues, then define the appropriate sampling effort on a cost–benefit (accuracy and precision) basis.

Putting all this together, one attractive possibility would be to aim for a "Year of the fishery ecosystem". If we could identify as many surveys as possible that we could afford to lose for one year, we could then deploy the vessel time in a one-off, dedicated, and high intensity ecosystem survey (e.g. in a particular ecoregion??). This would provide an invaluable snap shot, and would provide an excellent context in which to define future sampling needs.

It is important to note that the WG intends no criticism of the existing surveys or their value. In many cases these surveys provide valuable time-series of fishery-independent data that are available from no other sources. The intention of this process is to identify ways of rationalising the collection of additional data and integrating this with the existing use of the surveys.

3 Workshop on Cataloguing Data requirements from surveys for the EAFM (addressing ToR b) and c)

Based on the discussion reported in chapter 2, TGISUR recommended that the first workshop under its aegis should be on cataloguing the data requirements from surveys for the EAFM. A detailed justification and specification for this workshop is attached as Annex 3.

This workshop will require input from a range of expert groups covering ecosystem groups as well as survey groups.

Survey groups would include; AGREP, IBTSWG, WGACEGG, WGBEAM, WGBIFS, WGMEGS, WGEGGS, WGIPS, WGNAPES, WGNEACS, AND WGRS.

Ecosystem groups would include; BEWG, ICESSAS, WGBIODIV, WGDEEP, WGDEC, WGECO, WGFE, WGFS, WGHAME, WGPE, WGPME, WGSE, WGSPEL, and WGZE.

Participation of crossover groups like WGOOFE would be very useful

However, the wider participation the better. As well as participation by ICES expert groups. It was recognized that it would be useful to have a wide participation from the national institutes involved in surveys and in ecosystem work.

4 Complimentary survey technologies (addressing ToR d)

This ToR was not explicitly addressed at the meeting. However this task is identified as being part of the second stage of the process described in Chapter 2. The technological needs of the surveys and complimentary technologies should be addressed *after* defining the basic data needs.

5 Recommendations

- The next meeting of TGISUR (Chair: D.G. Reid) will take place in Galway, Ireland from the 22–23 April, 2010. Detailed justification is presented in Annex 2
- A workshop on Cataloguing Data requirements from surveys for the EAFM [WKCATDAT] (Chair: D.G. Reid, Ireland) meet in Galway, Ireland, 20–22 April, 2010. Detailed justification is presented in Annex 3

6 References

ICES. 2009. Report of the Planning Group on Northeast Atlantic Pelagic Ecosystem Surveys (PGNAPES), 18–21 August 2009, Tórshavn, Faroe Islands. ICES CM 2009/RMC:06. 139 pp.

Annex 1: List of Participants

NAME	COUNTRY	E-MAIL
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Annex 2: WGISUR terms of reference for the next meeting

The **Transition-Group on Integrating Surveys for the Ecosystem Approach** (TGISUR), will be renamed the **Working Group on Integrating Surveys for the Ecosystem Approach** (WGISUR), chaired by D. Reid, Ireland will meet in Galway, Ireland 20-22 April 2010 to:

a) Develop surveys to be applicable to the ecosystem approach;

b) Identify expert groups and develop terms of reference for them;

c) Identify issues common to all surveys, set up workshops and manage them as appropriate;

d) Identify complementary technology to add value to surveys;

e) Evaluate the outcomes of WKCATDAT and make recommendations on the basis of this.

The first four ToR are replicated from 2009 and represent the core work of the TG. The fifth represents the first major step in this process

WGISUR will report by 2 June 2010 (via SSGESST) for the attention of SCICOM and ACOM.

SUPPORTING INFORMATION

Priority	High. Integration of surveys is needed in support to the ecosystem approach. The working group will meet that objective by steering all survey groups and providing a home in which integration can be planned.
Scientific justification	Surveys are coordinated on a regional basis but there are issues common to all, requiring the steering of all groups. Also the integration of surveys is needed in support to the ecosystem approach. International survey programs involve many vessels and teams. Calibration of methods, protocols and exchange in expertise requires global steering. Methodological issues include topics on: species identification, echogram interpretation, Phase I analysis of data such as combination of indices of different nature (acoustic and trawl) or of multiple surveys (different gears), precision of estimates. International survey programs deliver data and products. Regional databases are being developed for all surveys (not only for BTS but also for acoustic, egg and larvae surveys). Standard data format and portals to access data require global steering of all survey groups. Also, steering the format of survey products (e.g. atlas) for all surveys would contribute to constructing the overall picture needed for the ecosystem approach. International survey programs are evolving towards ecosystem monitoring plateforms. Such evolution should be steered for all surveys. In particular, can ecosystem monitoring be performed by fisheries surveys as they are presently by just adding new data collection protocols? Adaptation of surveys for the ecosystem approach include topics on: Planning of surveys to fit for a purpose and evaluation of the compliance of surveys to fit for the purpose; Spatio-temporal scales and designs to sample different components of the ecosystem; Coordination and combination of surveys of different nature and scales (sampling processes and surveying patterns, annual and intra-season

	surveys).
Resource requirements	No specific requirements beyond the need for members to prepare for and participate in the meeting. There will be need for a meeting room at ASC 2010.
Participants	15–20 Chairs of identified Expert Groups and additional experts invited by the Steering Group chair as appropriate
Secretariat facilities	None
Financial	None
Linkages to advisory committees	SCICOM and ACOM
Linkages to other committees or groups	Survey based WG under SCICOM, WGECO and other ecology based WG
Linkages to other organizations	There are no direct linkages to other organizations.

Annex 3: Recommendation for Workshop on Cataloguing Data requirements from surveys for the EAFM [WKCATDAT]

The **Workshop on Cataloguing Data requirements from surveys for the EAFM** (WKCATDAT), **c**haired by D. Reid*, Ireland, will meet in Galway, Ireland, 20–22 April 2010 to:

a) Provide a comprehensive catalogue of the data required from surveys to support all aspects of the EAFM; including *inter alia* fish stock assessment, ecosystem modelling, ecosystem indicators, and process based research;
b) Provide guidance on what factors should be considered of higher priority in modifying or improving surveys;
c) Report on any implications from this exercise for the planning of future surveys.

WKCATDAT will report by 1 June 2010 (via SSGESST) for the attention of the SSGEF, WGISUR, SCICOM and ACOM.

SUPPORTING INFORMATION

Priority	High: This is the first step in the work identified for WGISUR, and provides the baseline information against which any evaluation of survey data collection can be evaluated. It also deocuments the data needs for these surveys to be used in redesigning and optimizing these surveys for broad ishery ecosystem data collection.
Scientific justification	The main source for ecosystem data for the EAFM come from research vessel surveys, of which the majority are fish stock assessment surveys. Ecosystem data collection on these surveys is often ad hoc, unplanned and unfocused. With the EAFM becoming enshrined in policy and legislation within the EU and North America, it must be emphasized to identify what the data needs from surveys are for the EAFM. This information will be used within WGISUR to evaluate surveys and survey methodology to optimize the ecosystem component of fisheries research. Research vessel surveys are our primary data collection tool, and coordination and conduct of these surveys is a key role for ICES through many survey based expert groups, e.g. WGMEGS, IBTSWG, WGBITS etc. ICES is ideally placed to carry out this task, given it's wide range of expertise in the fishery ecosystem work, survey coordination and planning and in promulgating the EAFM. Succesful completion of this task will be benchmark and a test for the ability of ICES to integrate science across disciplines.
Resource requirements	No new research is proposed so costs would be negligable; travel to workshop etc.
Participants	Participants should include survey specialists as well as those involved in Ecosystem modelling, fish stock assessment and managememt, and process based studies. Ideally, the participation should include representatives from all institutes conducting RV surveys. We should aim to include experts in all survey métiers, but not from all institutes. In addition, it would be very useful to expand participation to include marine ecosystem experts from the academic sector. Instiutes are encouraged to recommend this to University scientists with whom they collaborate.
Secretariat facilities	None. Unless held at ICES
Financial	No financial implications.
Linkages to advisory committees	Principally SCICOM

Linkages to other committees or groups	Main links to SSGEF and SSGESST, but relevant to SSGHIE and SSGSUE. Links to all survey WG and to WGECO.
Linkages to other organizations	The work is relevant to all international groups promoting the EAFM. Contact will be made with PICES, FAO, SCOR, OSPAR and other relevant groups